

Mini MANAGEMENT 101

What you need to know about
Miniature Horse and Donkey care



Fence rails in Miniature Horse turnout areas should be closer to the ground and more narrowly spaced than what is required for larger breeds.

BY MARCIA KING

The small size of Miniature Horses and Donkeys belies their strength and hardiness. Explains Mikelle Roeder, PhD (animal physiology), professional animal scientist and equine nutritionist for Land O'Lakes Purina Feed, "The diminutive stature and extreme efficiency of Miniature Horses and Donkeys made them successful in harsh environments where nutrients were scarce and larger animals simply could not obtain adequate nutrition to survive. Their genetic heritage is one of great metabolic efficiency."

This combo of increased efficiency and smaller size means these undersized equids have slightly different issues and management needs than their larger cousins.

Whether due to breed tendency or incorrect care, Miniatures are more prone than larger equines to nutrition-related

disorders, hoof and limb problems, dental abnormalities, and dystocias (difficult births). Here's what you should know about caring for your Mini.

Prevention and Routine Care

Miniature Horses and Donkeys benefit from the same kind of routine care and prevention as larger equines.

Preventive measures Generally, protocols are the same for Minis, although dosage amounts are reduced. "Routine vaccines are given like that of a standard horse, while deworming is done per pound of body weight," says Daniel B. Slovis, DVM, co-owner and practitioner of Three Oaks Equine PLLC in Goochland, Va.

Contrary to rumors that have circulated on the Internet, West Nile virus vaccines are safe for Miniatures.

"I have encountered some Mini owners who refuse to give West Nile vaccine because some Web site said Minis can die from it," Slovis states. "No study has shown a complication with the vaccine and Minis."

Oral health Slovis also notes that some Miniature Horse and Donkey owners do not provide adequate dental care for their charges. But not only do Minis get the same oral problems as larger horses, they are more prone to have overcrowded teeth, retained caps, eruption cysts (soft tissue lesions overlying erupting teeth), delayed eruption, and wry mouth (cross bite). Monkey mouth (underbite) is also commonly seen in Minis.

"Minis have the same size and number of teeth as a standard size horse," he explains, "but all the teeth must fit into



Minis 101

a smaller region. Due to all the possible complications, early and frequent evaluation of the Mini's oral cavity is necessary to address developing problems before they become significant."

Hoof care Unless they are undergoing treatment for a hoof or lameness problem, Miniature Horses and Donkeys usually go unshod, says Pat Burton, who is a Certified Journeyman Farrier and an American Farriers Association (AFA) examiner who works with Professional Farrier Services and Hoofpros.com in Burleson, Texas. Unshod Minis are usually maintained with regular trimming every five to eight weeks, depending on the amount of hoof growth, says Burton.

"Young animals might be trimmed as often as every 10-14 days if you're correcting a problem," he adds.

Because Miniature Horses' hoof walls are very thin, Burton prefers glue-on shoes for Minis that must wear shoes. If absolutely necessary, Miniatures can be shod with fine-punched, handmade shoes using very small nails (size 3 race or smaller).

It's important that farriers are trained individuals who can recognize problems early. "Improper trimming over a long period of time leads to problems," Burton warns. "Having the proper tools (smaller size nippers, rasps, etc.) is a must for trimming Miniature Horses and Donkeys. Additionally, technique and handling of Miniatures

requires specialized positioning in order to properly trim and balance the smaller hoof capsule."

Daily hoof picking is recommended not only to remove debris that can get packed into the bottom of the hoof, leading to disease or lameness, but also to check for and address early hoof abnormalities.

Grooming Likewise, regular grooming of Minis helps keep the coat and skin healthy, allows the handler to spot early signs of skin problems, and contributes to the horse/owner bond.

Clipping is a matter of personal preference. Cazenovia College, in Cazenovia, N.Y., maintains a horse herd of 70, including six Miniature Horses. States Carol Buckhout, assistant professor of Equine Business Management, "We have a rather cold barn here, which probably attributes to the thick hair coat that our Minis grow. We body clip them, which then leads to the need for stable and turnout blankets. We also find they require body clipping in the summer to keep cool and for appearance purposes."

Feet and Limbs

Unfortunately, Miniature Horses and Donkeys have some acquired and genetic predispositions to limb and foot disorders. Slovis says Miniatures are more prone to

upward fixation of the patella (stifle locking), and they are more likely to have limb deformities such as carpal valgus (knock knees) and varus (bowlegs).

Burton reports seeing limb deformities, weak tendons, contracted heels, and overly long heels in a lot of young Mini foals.

Laminitis and founder are also common problems for Minis. "These are often nutritionally related, but can also occur any time the animal is stressed," says Burton.

Treatment and prognosis for limb and foot disorders vary depending on the specific condition and severity, but generally,



ERIN RYDER

Their small stature can be misleading—Miniature Horses and Donkeys are hardy and have exceptional strength in proportion to their body size.

370101-00-0405

NADA 141-228, Approved by FDA

Buscopan™ Injectable Solution

(N-butyloscopiumbromide, 20 mg/mL)

Antispasmodic (anticholinergic) and anticholinergic drug for intra-

venous use in horses only

Caution: Federal law restricts this drug to use by or on the

order of a licensed veterinarian.

Description: Buscopan is an antispasmodic (anticholinergic) and

anticholinergic drug which suppresses spasms of the digestive

system.

The chemical name for the active constituent of Buscopan

Injectable Solution is N-butyloscopiumbromide. It is a

water soluble, white crystalline substance with a molecular

weight of 440.40. Each mL of Buscopan Injectable Solution

contains 20 mg N-butyloscopiumbromide, 1.8 mg

methylparaben, 0.2 mg propylparaben, 6.0 mg sodium chloride,

and water for injection.

The chemical structure is:



Indications: Buscopan is indicated for the control of abdominal

pain (colic) associated with spasmodic colic, flatulent colic,

and simple impactions in horses.

Dosage and Administration: Administer a single injection of

0.3 mg/kg body weight (0.14 mL/100 lb). This is equivalent

to 20 mg N-butyloscopiumbromide per 100 kg

(220 pounds) body weight or 1.5 mL of Buscopan Injectable

solution per 100 kg (220 pounds) body weight.

Dosing Table (Dosage 0.88 mL/100 lbs.)

Body Weight (lb)	Dose (mL)	Body Weight (kg)	Dose (mL)
200	1.4	1000	6.8
300	2.0	1100	7.5
400	2.7	1200	8.2
500	3.4	1300	8.8
600	4.1	1400	9.5
700	4.8	1500	10.2
800	5.4	1600	10.9
900	6.1	1700	11.6

Contraindications: Buscopan should not be used in impaction

colics associated with ileus, or in horses with glaucoma.

Warnings: Not for horses intended for human consumption.

Not for use in humans.

Keep out of reach of children. If ingested, contact a physician

immediately.

Precautions: Buscopan is not recommended for use in nursing

foals or in pregnant or lactating mares, as safety has not been

established. The effects of Buscopan may be potentiated by

the concomitant use of other anticholinergic drugs. Studies

of concomitant administration of Buscopan with other drugs

have not been conducted. Drug compatibility should be monitored

closely in patients requiring adjunctive therapy. The safety of

Buscopan has not been established for intravenous (IV) administration.

Administration of Buscopan results in heart rate

elevation. Heart rate can be used as a valid indicator of severity

of pain for 30 minutes following IV injection.

Adverse Reactions: Transient tachycardia and decreased borborygmi

sounds lasted approximately 30 minutes following administration.

Transient pupillary dilation may also be observed.

To report suspected adverse reactions, to obtain a Material

Safety Data Sheet (MSDS), or for technical assistance, call 1

800-821-7467.

Clinical Pharmacology: Buscopan's spasmolytic action is

based on anticholinergic effects resulting from competitive

inhibition of parasympathetic activation (via muscarinic receptors)

of smooth muscle cells. The major side effect is a mild, transient,

elevated heart rate.

Pharmacokinetics: Following single IV administration of 14C-

Buscopan (0.4 mg/kg, side chain labeled) in 3 horses, the

major route of elimination of total radioactivity was via urine

and feces almost exclusively. The bulk of the radioactivity (>96%)

represents all 14C-labeled moieties derived from the 14C-

Buscopan dose was eliminated (urine and feces) within the

first 48 hours post-dosing. The elimination half-life of total

plasma 14C was estimated to be approximately 6 hours.

Therefore, the elimination half-life of the parent drug in plasma

is equal to or shorter than 6 hours. The main radioactive component

in the urine, which co-chromatographed with Buscopan

using thin layer chromatography (TLC), accounted for approximately

85% of the detected radioactivity.

Effectiveness: A multi-centered, field study was conducted to

establish the clinical effectiveness of Buscopan (0.3 mg/kg

body weight) for the control of abdominal pain (colic) associated

with spasmodic, flatulent and simple impaction colics in horses.

A total of 217 cases were randomly assigned to the

Buscopan or placebo group; investigators were masked with

respect to treatment.

Horses underwent a pretreatment colic examination, with

repeated exams at 5, 15, and 30 minutes following test article

administration. A total colic score was assigned to each case

based on 5 individual criteria (sweating, pawing, head and

body movement, kicking, and desire to lie down). A general

clinical impression was made at the 30-minute post-treatment

evaluation. No further evaluations were performed after 30

minutes.

Quarter Horses, Arabians, and Thoroughbreds accounted for

the majority of the cases. Fifty-three percent of the horses

were geldings, 39% were mares and 5% were stallions. Body

weights ranged from 300-1700 lb (136-772 kg), with a mean

of 968 lb (440 kg). Ages ranged between 4 months and 35

years, with an average of 10.6 years.

Total colic scores decreased throughout the 30-minute post-

treatment observation period for both Buscopan and placebo.

Scores were significantly lower (p<0.001) for the Buscopan

treated horses. Also, 86% of the Buscopan cases were rated as a

"success" (excellent, good, or moderate). This was significantly

greater (p<0.0001) than the 42% success rate for the

placebo group.

The effectiveness of Buscopan was also supported by the

overall improvement in the behavioral attitudes of the horses.

A significantly higher percentage of Buscopan treated horses

were rated as "alert/calm" at 15 and 30 minutes post-treatment

(p<0.005 and 0.0058, respectively), and a significantly

(p<0.006) greater proportion of placebo treated horses were

"nervous/restless." A comparable number of cases for both the

Buscopan and placebo groups were classified as "violent" or

"drowsy/depressed" at all time points.

Post-treatment heart rates were significantly elevated

(p<0.0001) for Buscopan treated horses at 5 and 15 minutes,

compared to the placebo treated horses, as expected due to

Buscopan's parasympatholytic effects. By 30 minutes post-

treatment, the heart rates for the Buscopan group did not differ

significantly from their pre-treatment heart rates. The intensity

and frequency of borborygmi in all four abdominal quadrants

was decreased for the Buscopan group at most post-treatment

evaluation points (p<0.02).

Animal Safety: Target animal safety was evaluated in several

studies, including dose tolerance, target animal safety, hemody-

namics, and field safety. There were no signs of toxicity or

adverse reactions. The pharmacological effects seen in these

studies were consistent with those of anticholinergic drugs

(see above).

In a target animal safety study, Buscopan was evaluated in two

phases. In the first phase, the drug was administered intra-

venously at dosages of 1, 3, and 5 times the recommended

dosage for three consecutive days. In the second phase it was given at

the recommended therapeutic dosage (30 mg per kg body

weight) at hourly intervals for three consecutive hours. Horses

receiving Buscopan tended to have transient, reduced intensity

of auscultated borborygmi, which can be attributed to the

intended therapeutic effect of the drug. There was no evidence

of gut stasis or colic. No other clinically significant effects were

found. Though a transient effect on heart rate was noted in

other studies, observations in this study (1-4 hours after drug

administration) were made after the primary pharmacological

activity for this drug had passed. Neither was there a significant

association of dosage with pupil/pupillary light response

as has been noted in other studies. Pupillary dilation is an

expected pharmacological response to this class of drug (anti-

cholinergic). The lack of a clinical response in this study is also

likely related to the longer time after treatment at which the

initial observations were made. In any event, this study shows

that any effect on pupillary light response is indeed transient.

There were no drug associated findings with respect to blood

analyses, nor were there any effects evident at necropsy and

histopathology.

In a tolerance study, four horses were administered 10 times

the recommended Buscopan dosage (300 mg/100 kg) and

were examined at 10 minutes and then at 1, 2, 3, 4, 24, and

72 hours post injection. All horses temporarily experienced

dilated and fixed pupils at 10 minutes post injection. Normal

pupillary light reflex returned in two horses at 4 hours and in

the other two horses at 24 hours. Heart rates were increased

at 10 and 60 minutes, but had returned to normal at 2 hours.

Oral mucous membranes were dry at 10 minutes, but were

normal at 2 hours. Gut motility, as judged by auscultated bor-

borygmi, was absent at 10 minutes post injection, but had

returned to baseline frequency and intensity by 3 hours in 2

horses and by 4 hours in the remaining horses. There were

two incidences of colic, with one horse showing mild colic at 1

hour, and another with mild colic at 11 hours. Both colic

episodes were transient and required no medication. There

were no drug associated changes in CBC, blood coagulation,

or serum chemistry. Neither were there any drug-related gross

or histopathological changes.

In a study of hemodynamic parameters, Buscopan decreased

right atrial pressure, while cardiac output was maintained. The

hemodynamic changes which occurred following Buscopan

administration were of little clinical significance, being qualitatively

similar to those reported for low doses of other anticholin-

ergics such as atropine.

Storage: Store at controlled room temperature, 59-86°F (15-

30°C).

How Supplied: Buscopan Injectable Solution is supplied in 50

mL multi-dose vials containing 20 mg N-butyloscopiumbromide

per mL.

References:

Roselweck, M.E.J., et al. 1991. Analgesic and spasmolytic

effects of dipyrone, hyoscine-N-butybromide and a combina-

tion of the two in ponies. Veterinary Record 129:379-380

Manufactured by:

Boehringer Ingelheim Vetmedica, Inc.

St. Joseph, MO 64506

Buscopan™ is a trademark of Boehringer Ingelheim Pharma

GmbH & Co. KG and used under license.

370101-00-0405

Code 370111

Revised 05/2004

BI 3701-3 3/05



Minis 101

early attention improves the outcome, particularly in young horses.

"It's important to correct problems before the growth plates are fused," says Burton, "because once the cartilage has fused, it's much more difficult if not impossible to correct deviations."

Nutrition

The most common dietary problems seen in Minis are obesity and disorders related to being overweight. Contributing factors are twofold: overfeeding and incorrect feeding.

"Acute overfeeding can result in laminitis and colic, both extremely dangerous," Roeder says. "Chronic overfeeding results in obesity, which then contributes to metabolic issues such as high blood glucose and insulin due to insulin resistance or insensitivity. This further predisposes the horse to laminitis and colic. There are structural prices to pay, also: Horses carrying too much weight put additional stress on joints, tendons, ligaments, and hooves, thus contributing to or compounding painful ailments such as arthritis."

"Many owners try to feed Miniatures like large horses," says Sean Reichle, BS (animal science), product manager for Farnam Companies. "However, they evolved from hardy lines of horses and ponies that tend to be very easy keepers and thus can be very prone to obesity and related nutritional problems."

Overall, Minis need fewer calories per pound than standard-sized horses, but it's not simply a matter of feeding proportionately less.

"First, the relationship between size and nutrient requirements is not necessarily linear," Roeder points out. "Miniature Horses and Donkeys often need considerably less feed than one might expect simply by extrapolating downward from what a larger horse needs."

"Second, Miniature Horses are more

prone to hyperlipemia/hyperlipidemia (high serum triglycerides or fat) than large horses, especially when dieted severely," Roeder continues. "The insulin resistance that often accompanies obesity exacerbates this problem, which can result in pancreatitis and fatty liver. Dieting should optimally be a gradual process that involves moderate restriction of intake and regular exercise."

There are very few formulas with feeding rates and volumes specifically designed for the Mini's smaller digestive system.



Miniature Horses and Donkeys have some acquired predispositions to limb and feet disorders so it's important to monitor their development and catch any abnormalities early.

Says Reichle, "Most owners feed a large-breed fortified feed, trying to adjust the feeding rates down to a smaller horse rate. This doesn't always provide appropriate volume, so the horses still think they are hungry and will continue to eat. Hungry horses are more likely to have behavior-related conditions, including wood chewing."

To keep Minis svelte, owners need to modify portions and feed according to the Miniature's life stage (growing, lactating, etc.), activity level (working, breeding, or couch potato) and body condition. Also, they must provide adequate exercise.

"Those animals on a maintenance level have relatively simple needs and will survive very nicely on a surprisingly small amount of feed," notes Roeder. "Start with a well-balanced feed designed with Miniature Horses or Donkeys in mind, one that is relatively low in sugars and starches and calories, but higher in fibers from various sources (Farnam has a new feed designed specifically for Miniature Horses and pony breeds). Higher fiber diets are also better for Miniature Donkeys, as donkeys in general thrive on diets higher in fiber than

horses require and will have a tendency to become overweight and suffer metabolic issues if overfed traditional horse feeds."

Adjust intake to meet the caloric needs of the individual animal by weighing the feed, not by measuring its volume. If possible, feed smaller meals more frequently. (The Farnam Miniature Horse & Pony feed has a recommendation of 0.75 pounds per 150 pounds of body weight for adult maintenance, plus good-quality forage.)

As with any overweight horse, grazing should be restricted. "Unlimited turnout on a lush pasture is probably going to be dangerous for most horses of any size, as it constitutes an opportunity to constantly eat too many calories," Roeder says. "Conversely, a relatively active horse on a poor- to medium-quality pasture may be able to be out 24/7 and will probably need supplemental feed, especially in the winter."

Exercise is an important component for weight control, health, and fitness. Explains Roeder, "Exercise not only burns calories, it helps to maintain the metabolic rate, and it can decrease resistance to insulin at the cellular level, thus resulting in improvement in glucose/insulin status. Just about every system—digestive, lymphatic, circulatory, respiratory, skeletal, etc.—in the horse's body works better with activity."

Adequate exercise can often be achieved with turnout; if the animal is obese, turn him out in a dry paddock or very poor pasture where he can't consume many calories. Make sure he has the opportunity to

expend these calories by moving around and socializing, both of which are also important for physical and mental wellness. Longeing, driving, handwalking, or using a walker or treadmill also promotes weight loss and fitness.

Other Management Considerations

Some owners prefer to keep different-sized horses in separate turnout accommodations because of the increased risk to the

Mini, should he receive a bite or kick from a standard-sized horse. However, Minis and standard-sized horses generally get along okay, says Slovis. Incompatible individuals should be separated.

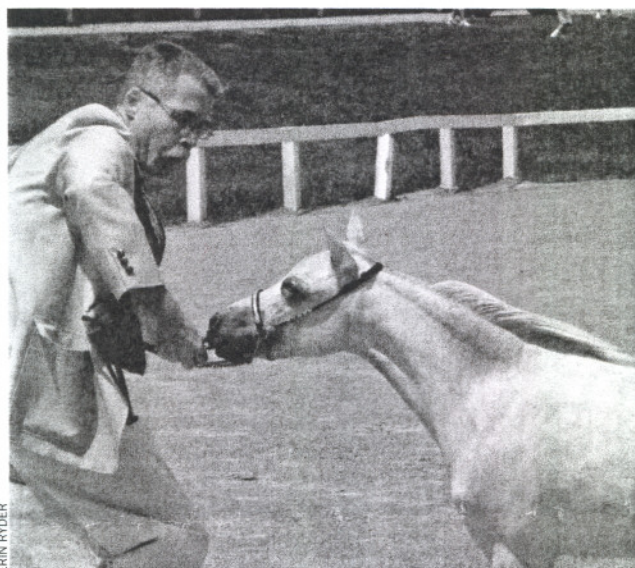
To safely contain Minis, rails, planks, or other fencing materials that create horizontal barriers need to be lower to the ground and closer together. Overall fence height can be reduced to Mini size if you're not enclosing mixed-sized herds. Reports Buckhout, "We have plank fencing at our facility, which works very well for our Minis since the rails are close enough to the ground to avoid Mini escapes."

Like their larger-sized cousins, Minis need shelter from rain, driving winds, and extreme cold—anything from a run-in shed to a cozy stall will suffice. These equids are not delicate, however.

For stabling, some owners simply make do with regular stalls. But make sure to hang doors low enough to the ground to prevent escape. Says Buckhout, "Since space is always an issue at our facility, we house our six Minis in two pens that are approximately 16 by 16 (feet) each. The pens have lower sides than a normal stall, and we put three Minis in each pen. We just have to be sure that we know which ones prefer to be together and which ones do not get along."

Others prefer Mini-sized stalls with lower doors that permit a view of neighboring horses as well as allow adequate airflow. Remember to place feed and water buckets within the Mini's reach.

Keep Minis' stall and turnout areas free of trash and debris to avoid cuts, injuries, and ingestion of foreign objects. Warns Slovis, "Minis are known to eat anything,



Regular grooming of Minis helps to keep the coat and skin healthy.

especially plastic bags. Since Minis have a smaller intestinal diameter, bags can get stuck, causing colic and requiring surgery to fix the problem. Usually the bag will develop deposits—minerals build up around the bag causing a rocklike structure to form (enterolith)—blocking the intestines. This is more common out West because of the high calcium in the water and soil, although this can happen anywhere."

Reproduction Issues

Of the Miniature-specific reproduction issues, dystocia and monitoring difficulties are of the most concern.

Christine Schweizer, DVM, Dipl. ACT, formerly of Cornell University, is now a field service veterinarian at Hagyard Equine Medical Institute in Lexington, Ky. "We see more dystocias and Caesarean sections with Minis than with any other breed," she states, "not only because of problems with malpositions, malformations, overly large foals, but also because of the relatively smaller pelvic size of the Miniature mare in which to perform your corrections. In the larger mare these problems might be easier to correct, whereas with the Mini mare we might not be able to correct these without surgical intervention."

To reduce chances of dystocia, study the foaling history of the stallion (Does he throw bigger foals?) and, in general, breed larger mares to smaller stallions. Also, summon the veterinarian when foaling is imminent. "Any foaling that runs into trouble is easier dealt with sooner rather than later," Schweizer says. Early intervention can increase foal and dam survival rates.

Interested in a Horse Therapy career?

Study The Total Balance Method and truly make a difference in the way horses and their owners work and relate!

One comprehensive course of study including:

- Anatomy, Physiology and Kinesiology
- Massage and Energy techniques
- Relationship of chiropractic and performance
- Applied Acupuncture Theory
- Podiatry and travel patterns
- Skill in using Essential oils, LEDs *and more!*

Certification program with hands-on and correspondence instruction with continued business support.

Now accepting applications for sessions starting in September.

Emphasis on individual attention and support for each student.

"There is no single program that covers this level of material."



For more information and prices call today or visit us online

877-833-6454
www.equinemyotherapy.com



Minis 101

Monitoring the Mini mare through her heat cycle and pregnancy is a little tricky. "Monitoring is done by teasing plus/minus rectal palpation and ultrasound," explains Schweizer. "Any rectal exam to any size horse carries the risk of causing a rectal tear, which is frequently fatal. That risk is heightened in Minis simply because of their small size."

To minimize that risk, the veterinarian can use proper restraint, sedation and/or a local anesthetic for comfort, drugs to help relax the rectum, good lubrication, and gentle, correct technique. Having small hands also helps.

"Still, the fact remains that if the mare jumps at the wrong time or chooses to strain at the wrong moment, she puts herself at risk," Schweizer warns.

Some Mini owners opt to forego rectal monitoring and choose other options. "In general, conception rates are good with pasture breeding or hand breeding, when teasing behavior is interpreted accurately," says Schweizer. "With a natural breeding,

the stallion and mare are the best judges as to timing of ovulation. You can also identify behaviorally when ovulation had occurred: Mares stop being receptive to the stallion usually 24-48 hours after ovulation."

Specific hormones (such as equine chorionic gonadotropin, ECG) that circulate in the blood beginning about Day 40 post-breeding can confirm pregnancy.

"The presence of ECG doesn't tell you if it's a viable pregnancy, just that there was a viable pregnancy at 40 days of gestation," Schweizer says. "But after 100 days of gestation, another hormone (estrone sulfate) is detectable, signaling a viable fetal placenta." Also, after 70-80 days of gestation, the veterinarian can do a trans-abdominal ultrasound to image the developing fetus.

Two other issues affect Mini broodmares: ■ Their breeding season often begins a



Obesity is a concern with Miniatures, but adequate exercise, such as driving, can often be achieved with turnout in a dry lot.

couple of weeks later in the year. Says Schweizer, "For instance, in New York I would expect an average-size mare to be having her first ovulation of the year around the end of April, but for Minis, it wouldn't be surprising if they didn't start cycling until they get into May."

■ Sometimes Minis hang on to a follicle in the ovary a lot longer than expected. "I have seen a small percentage of Mini mares who do this routinely," states Schweizer. "However, a retained follicle means she won't have a normal ovulation, and the breeding will fail to result in a conception."

As for Miniature stallions, the saying, "Bigger factories make more cars" is true. "Testicular spermatid output is directly correlated to the amount of testicular tissue present," Schweizer confirms. "So, in general, sperm numbers in Miniature stallions are less than in standard-sized stallions."

Take-Home Message

In many ways, Miniature Horses and Donkeys need the same kind of care and attention as larger breeds. They need training and handling so they'll learn to respect their owners and be safe around children.

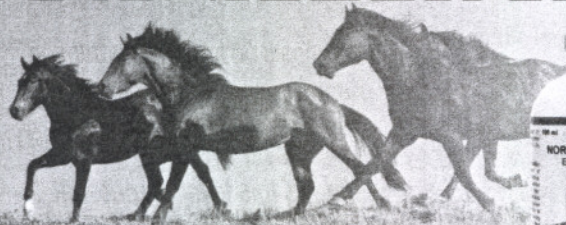
They need preventive medical care, exercise, good nutrition, and proper veterinary care to remain fit and healthy. While their diminutive size could suggest a certain fragility, they are, in truth, anything but fragile.

"Miniatures are strong and hardy animals," Buckhout says. "They should not be treated as an inferior breed. My experience has shown me that they are pleasant animals that are relatively easy to care for and maintain."

ABOUT THE AUTHOR

Marcia King is a free-lance writer based in Ohio. She specializes in articles on equine and pet health, care, training, and behavior.

QUALITY PROTECTION



Normal Equine Serum, Equine Origin
For conditions in which blood enrichment is desired

Tetanus Antitoxin, Equine Origin
Aids in immediate prevention and treatment of Tetanus

Tetanus Toxoid concentrated & unconcentrated
For use as an aid in the prevention of Tetanus

West Nile Virus Antibody, Equine Origin
Aids in the control of disease due to West Nile Virus in horses
Use when WNV is detected in unvaccinated animals and/or when vaccinated animal contracts WNV



Colorado Serum Company

Trusted veterinary biologicals for all major livestock species since 1923



Call or visit our web site for a full list of quality livestock products, or check with your distributor

800/525-2065

www.coloradoserum.com